

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

DAM, MULTIPLE-PURPOSE

(no.)
CODE 349

DEFINITION

A dam constructed across a stream or a natural watercourse that has a designed reservoir storage capacity for two or more purposes, such as floodwater retardation and irrigation water supply, municipal water supply, and recreation.

PURPOSE

A multiple-purpose dam must provide distinct and specific storage allocations for two or more of the following purposes: (1) floodwater retardation, (2) irrigation, (3) fishing, hunting, boating, swimming, or other recreational uses, (4) improve environment or habitat for fish or wildlife, (5) municipal, (6) industrial, and (7) other uses. (A reservoir for which multiple-purpose use is made of the same storage allocation is not a multiple-purpose dam; however, a dam designed for joint-use storage is a multiple-purpose dam.)

CONDITIONS WHERE PRACTICE APPLIES

General

This practice applies only to sites meeting all the following criteria:

1. Topographic, geologic, hydrologic, and soil conditions at the proposed site are satisfactory for constructing a feasible dam and reservoir.
2. The watershed is protected from erosion to the extent that the sediment yield will not shorten the planned effective life of the reservoir.

3. Water is available from a single or combined source of surface runoff, base flow, or from subsurface storage in sufficient quantity and adequate quality to satisfy the intended purposes.

Legal Requirements

The cooperator (individual, group, or unit of government) shall (a) contact the Department of Land and Natural Resources, State of Hawaii, concerning the right to use water originating from state-owned land when any portion of the drainage area contributes to the proposed structure, (b) contact the U.S. Army Corps of Engineers for a 404 permit when constructing a structure on any stream which flows at least 180 days during the year.

Scope

This standard applies to dams which have separate storage allocations for two or more of the purposes listed. (Sediment storage is not considered a separate purpose except as indicated under the practice **Sediment Basin**, Code 350.)

CRITERIA

Foundation, embankment and spillway.

All dams designed under this standard shall meet or exceed the foundations, embankment and spillway criteria as called for in Hawaii Standard for **Pond** (Code 378) or in TR-60, as appropriate.

Floodwater retarding pool and spillway.

Dams having a floodwater retarding purpose shall meet or exceed the

requirements of the NRCS National Standard for **Floodwater Retarding Dam** (Code 402).

Outlet works. Outlet works discharging releases for several purposes shall have adequate capacity to carry the peak flow resulting from the combined demands at any time. Outlet conduits and appurtenances shall be designed according to criteria that are equal to or better than that called for in the Hawaii Standard for Ponds (Code 378) or in TR-60, as appropriate.

Storage. The useable storage capacity shall be adequate for all purposes. Seasonal variations in demand and the expected losses from seepage and evaporation must be considered.

Sediment storage. The capacity, in addition to that required for all other purposes, must offset depletion by sediment accumulation for a period equal to the design life.

Type of structures. All dams and appurtenances shall be designed to meet applicable NRCS standards for the specific type and class of structure.

Vegetation. The embankment and disturbed areas shall be vegetated to control erosion. Excess excavated material shall be leveled and revegetated. See Hawaii Standard for **Critical Area Planting** (Code 342).

PLANNING CONSIDERATIONS FOR WATER QUANTITY AND QUALITY

Water Quantity

1. Effects on the water budget, especially of longer downstream flow durations, evaporation from water surface, and infiltration in the bottom and sides of the pool area.
2. Effects of water taken from the reservoir for agricultural, industrial, or municipal use.

Water Quality

1. Effects on the movement of sediments, pathogens, and soluble and sediment-attached substances carried by runoff.
2. Effects of increased downstream bank saturation resulting from longer flow duration on erosion and sediment yield.
3. Potential use of the reservoir for recreation. Factors include increased use of pesticides, human waste, and other pollutants.
4. Effects of sediment pool on temperature and dissolved oxygen on downstream waters.
5. Effects of location of the outlet structure on downstream water temperature and dissolved oxygen.
6. Changes in ground water quality caused by increased infiltration of soluble substances.

PLANS AND SPECIFICATIONS

Plans and specifications for Multiple-Purpose Dams shall be in keeping with this standard and shall describe the requirements for application of the practice to achieve its intended purpose. Plans should include a plan layout of the embankment and reservoir, profile of the embankment, cross section of the embankment, profile of the emergency spillway, cross section of the emergency spillway, dimensions and material requirements of the principal spillway, and details and material requirements of the principal spillway riser.

Plans shall specify recommended grass species, planting method and fertilizer for vegetation on the embankment and surrounding areas.

NRCS Hawaii **Pond** Specification (Code 378) may be furnished as a construction specification for dams within the scope of the standard for Ponds. Dams within the scope of TR-60 shall be constructed according to guide specifications contained in National Engineering Handbook, Section 20.